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and Olpidiaceae, with perhaps also the Hyphochytriaceae. He follows PAVILLARD in believing that the Synchytriaceae show most similarity in cytology to the Sporozoa, and were probably derived from them, but he does not commit himself to any opinion concerning the origin of the second group.—ROBERT F. GRIGGS.

Movement of water.—The ascent of water in vessels containing chains of water and air bubbles (Jamin's chain) may take place in one of two ways: either the whole chain moves upward or the water alone moves while the air bubbles are stationary. SCHAPOSCHUIKOFF¹⁴ claims that the physical conditions of a Jamin's chain in the conducting vessels of plants are not such that they prevent the movement of the chain as a whole. Reasoning theoretically, he concludes that the presence of cross walls in the vessels do not hinder such a movement. The bubble just above the cross wall and the one just below are under unequal pressures, the former under reduced pressure owing to the suction from above, and the latter under increased pressure owing to the rise of water below. On account of the increased pressure the bubble below goes into solution, passes through the cross wall, and separates out again under the reduced pressure above. It is assumed that the bubbles arise only from gases dissolved in the water filling the vessel. They separate out when the water consumption by the plant is greater than the supply, causing a reduced pressure in the vessels.

The author constructed a very ingenious apparatus to put the above theoretical conclusions to the test of experimental proof. In his apparatus gas bubbles began to form from the gases in solution when the pressure reached one-half to one-third of an atmosphere in a glass tube corresponding to a conducting vessel in the plant. As soon as a gas bubble reached the cross wall, the filtration of water through the membrane ceased. The manometer soon showed an increased pressure in the tube, due to the continued rise of water from below. After a short time the bubble went into solution and passed through the water-saturated membrane, allowing the filtration of water to continue. The manometer now showed a sinking of pressure again. The passage of the bubbles by the sculpturing of the wall may be explained in a way similar to their passage through the cross walls. As soon as a bubble is held by a thickening in the wall, unequal pressures are set up, causing it to dissolve sufficiently to pass on.—CHAS. O. APPLEMAN.

Chaparral.—A woodland consisting of stunted trees, seldom more than 10 feet, and apparently a response to the peculiar conditions of Southern California, has been studied by PLUMMER,¹⁵ and a report made upon its impor-

¹⁴ SCHAPOSCHUIKOFF, WALK., Sollen die Luftblässchen der sogenannten Jaminschen Kette in den Leitungsbahnen der Pflanzen für immobil gehalten werden? Beih. Bot. Centralbl. 27:438-444. figs 2. 1911.

¹⁵ PLUMMER, FRED G., Chaparral. U.S. Dept. Agric., Forest Service, Bull. 85, pp. 48. 1911.

tance in conserving moisture and regulating the flow of streams in a region where the water supply is of the utmost economic importance. This conservation is accomplished by the root system penetrating the soil and assisting percolation, while at the same time the trees prevent erosion by shading the ground, by breaking the force of hot winds, and by lessening evaporation. The most active destructive agent is fire, which rapidly sweeps the half-dry vegetation from the arid mountain slopes. The investigator offers good arguments in support of his belief that the protection of the chaparral cover is of great importance in preventing the loss of water needed for irrigation.

From the ecological viewpoint, the "true chaparral," which seems to be a climatic formation holding complete possession of its domain and found principally in California, is distinguished from "mock chaparral," which is a pioneer association of similar dwarfed trees occurring in the forest succession in parts of Arizona, New Mexico, Colorado, and Utah. In both the same genera and often the same species of sclerophyllous trees are to be found. The dominant members are various species of *Adenostoma*, *Arctostaphylos*, *Ceanothus*, and *Quercus*, while forms of *Rhus*, *Cercocarpus*, *Rhamnus*, and *Ribes* are among those of secondary importance.

The study includes a consideration of the ecological relations and relative economic importance of the more abundant species, of the methods of controlling fires, of restocking after fires, and of the possibility of introducing larger tree species. A map shows the distribution of this interesting forest formation in California.—GEO. D. FULLER.

Stems of *Diplolabis* and *Metaclepsydropsis*—GORDON¹⁶ has described the hitherto unknown stems of *Diplolabis Römeri* and *Metaclepsydropsis duplex*, as well as the attachment and vascular supply of their leaves. The stem in both species is a long dichotomous rhizome, with nodes only at wide intervals. The stele, circular in section, is in *Diplolabis* composed entirely of tracheids, while in *Metaclepsydropsis* there is much parenchyma scattered among the small central xylem elements. The leaf trace departs in each case as an elliptical strand with two lateral mesarch protoxylems. In the lower portion of its course, it may resemble in turn the petiolar bundles of *Clepsydropsis*, *Dineuron*, or *Zygopteris*; but after its entrance into the petiole it assumes, respectively, the typical "H" of *Diplolabis* and the "dumb-bell" of *Metaclepsydropsis*. The changes in structure presented by the foliar bundle as it ascends from node to petiole, and the striking similarity at the base of the leaf trace between these two species, and indeed among all the *Zygopterideae*, furnish further evidence of the conservatism of this region and of its importance as a seat of ancestral characters.—E. W. SINNOTT.

¹⁶ GORDON, W. T., On structure and affinities of *Diplolabis Römeri* (Solms). Trans. Roy. Soc. Edinburgh 47:711-736. pls. 1-4. 1911.

———, On the structure and affinities of *Metaclepsydropsis duplex* (Williamson). Trans. Roy. Soc. Edinburgh 48:163-190. pls. 1-4. 1912.